SPATIAL ASSOCIATION OF FOREST TREES AFTER LOGGING BASED ON THEIR DISTANCES AND DIAMETERS

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SUMMARY

One of the principal objectives in forest ecology is to understand mechanisms and processes regulating distribution, abundance, and association of forest trees. Our study compares the spatial structure of logged forest stands including high impact logging (HIL) and medium impact logging (MIL) to the unlogged forest (UL) based on canopy stories to identify the most important underlying mechanisms and processes. On each forest stand, one ha plot was designed and measured diameter at breast height (dbh), tree height, species and relative coordinates of all trees with dbh ≥ 2.5 cm. Methods of univariate and bivariate spatial point pattern analysis were used to analyze distribution and association of forest trees based on their distances and diameters on three vertical strata: understorey, midstory and overstorey. The results showed stationary of trees in UL while competition between tree-tree was found in HIL and MIL. Relevant ecological theories showed that principal mechanisms may regulate tree distribution and association such as dependent mortality, dispersal limitation and neutral theory. Effects of selective logging in the past disturbed spatial structure of these natural forests. Based on these findings, silvicultural treatments may be applied to reduce competitive interaction, facilitate productive increment and sustainable forest management.

Keywords: Mark correlation function, pair correlation function, selective logging, spatial pattern analysis, tropical broadleaved rain forest.

Ngày nhận bài : 05/4/2019
Ngày phản biện : 21/5/2019
Ngày quyết định đăng : 29/5/2019